(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 258 648 A1**

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **87111106.8**

(51) Int. Cl.⁴: **A63C 5/00**

(22) Date of filing: **31.07.87**

(30) Priority: **22.08.86 IT 4160186**

(43) Date of publication of application:
09.03.88 Bulletin 88/10

(84) Designated Contracting States:
AT CH DE FR LI

(71) Applicant: **S.B.P. S.r.l.**
Via C. Battisti No. 64
I-35100 Padova(IT)

(72) Inventor: **Quaggiotti, Vittorio**
Via Siracusa N. 24
I-35100 Padova(IT)

(74) Representative: **Petruzzelli, Antonio**
Via E. De Amicis No. 25
I-20123 Milan(IT)

(54) **Double-shoe ski with intermediate linking member.**

(57) A double-shoe ski comprising a front shoe (11) and a rear shoe (10) aligned according to their longitudinal axis; and intermediate floating arm (12) linking together the two shoes.

Compression spring members (20, 21) are disposed between said linking arm (12) and the shoes (10, 11) of the ski.

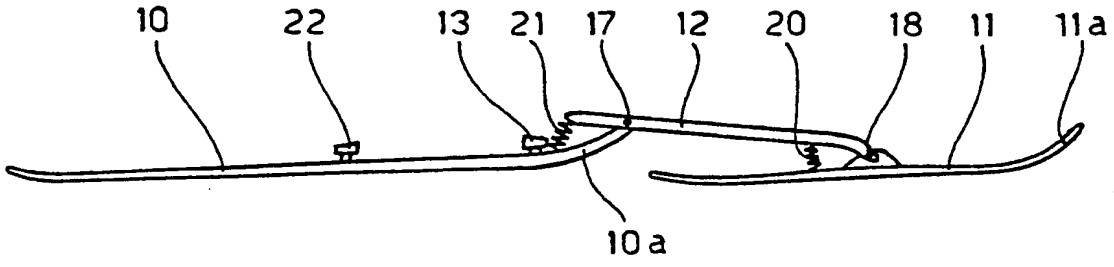

Fig. 7

EP 0 258 648 A1

Fig. 5 shows the distribution of the reaction load of a conventional flexible ski with limited rise;

Fig. 6 shows the distribution of the reaction load in a conventional "compromise" ski;

Fig. 7 shows a side view of a first embodiment of a ski according to the invention;

Fig. 8 shows a side view of a second embodiment of a ski according to the invention;

Fig. 9 shows a top view of the skis of figures 8 and 9;

Fig. 10 shows the natural profile in an unloaded condition, of the ski of figure 7;

Fig. 11 shows the flattened profile of the ski of figure 10, loaded by the weight of the skier;

Fig. 12 shows the two reaction load distribution situations for the ski according to the invention.

Figures 1 to 6 show different situations for a conventional ski, the characteristics of which are compared further on with the ski according to this invention.

In particular, figure 1 shows tha natural profile of a conventional ski, in the non-loaded condition, in which reference p has been used to indicate the "rise" or maximum camber at the centre line of the ski. Figure 2, on the contrary, shows the profile of the same ski highly deformed in the opposite direction, especially at the front part of the ski when curving with the skis parallel, as mentioned previously, while figure 3 shows the same ski loaded by the weight of the skier and flattened against the ground. In this latter condition, in the case of skis having a high rise and high flexural rigidity, the ground reaction load is schematically represented by the graph of figure 4, in which reference l has been used to indicate the considerable distance between the two reaction load peaks. The remaining figures 5 and 6 show the reaction load situation in two conventional skis, the first with limited rise and a high degree of flexibility, and the second with characteristics ranging between those of the first.

As shown in figure 7, unlike the conventional ski of figure 1, the ski according to this invention comprises two separate shoes 10, 11 of different lengths aligned according to their longitudinal axis. The two shoes 10 and 11 are connected by a mechanical arm 12, movable on a plane perpendicular to the base surface of the shoes; said arm or link member 12 having the function of providing most of the flexural elasticity of the ski, as well as the task of ensuring the utmost torsional rigidity. In particular, as shown in figure 7, the ski comprises a main shoe 10, or rear shoe, which extends from the tail to a sufficient portion (100 - 200 mm) ahead of the area designed to house the toe binding 13, with the front end 10a of the main shoe 10 slightly curved up wards. The ski comprises a second shoe 11, or front shoe, comparable to the shovel of a conventional ski, having an upward curved tip 11a. As shown in the top view of figure 9, the profile of the side edges 14 of the rear shoe 10 is preferably slightly convex from one end of the shoe to the other; likewise, the profile of the side edges 15 of the front shoe 11 is fully convex, or "drop-shaped" with a truncated tail, whose point of maximum width 16 is located over half way and in the front portion of the shoe itself.

The two shoes 10 and 11 are connected by means of a rigid or semi-rigid floating arm or link member 12, which is pivoted on transversal axes to the ski, by 17 to the front end of the rear shoe 10, and by 18 to the front shoe 11, in a position to the rear of the point of maximum width of the front shoe.

A first elastic or compression member 20, (spring, rubber element, etc.) which suitably restricts the mobility of the front shoe 11 on said hinge 18 is disposed between the arm 12 and the front shoe 11.

A second elastic or compression member 21, (spring, rubber element, etc.) is disposed between a rear extension of the arm 12 and the rear shoe so as to suitably control the mobility of the arm 12 on the main hinge 17 and, therefore, the rotational traversing movement of the front shoe 11 with respect to the rear or main shoe 10, thereby constituting the elastic deformation of the overall assembly of the two shoes linked together to form a ski.

The compression members 20 and 21 can easily be provided with means to adjust the volume of their load, as well as stop means to define the position of the start and end of the stroke itself, thereby offering the possibility of producing skis with "rise" and flexural rigidity which can be adjusted according to need (figs. 7 and 10).

According to the embodiment of figure 8, the rear compression member 21 could, if required, be eliminated, and with it, the hinge 17, so that the connection between the arm 12 and the rear shoe 10 would become rigid and the elastic fnction would be entrusted exclusively to the flexibility (suitably provided) of the rear shoe itself, in its projecting portion 23 which extends forward beyond the position of the foot binding 13 (fig. 8).

Intermediate solutions are obviously possible, so that the flexural elasticity of the ski can be entrusted partly to the flexible projection of the rear shoe 10, as described above, and partly to an independent elastic system (springs or the like) functioning as a "limiter" of the degree of freedom of a hinge, such as the hinge 17 originally provided for the rear shoe.

However, in addition to what has been described hereinbefore with regard to the functional features of the invention, stress should also be placed on the industrial aspect, which proves to be of even greater interest.

In fact, in a ski of this type, the flexural elastic characteristics depend for the most part upon the mechanical system comprising the arm 12 and the relative compression springs 18, 21.

Consequently, the shoes 10 and 11 are no longer required to be flexible, except, partly on the tail portion of the rear shoe 10.

This means that each shoe 10, 11 no longer requires a sandwich structure and can be very inexpensively made in one piece, or by fitting together longitudinal shells, according to injection molding techniques using suitable plastic materials.

This is an extremely important aspect which can revolutionize the production and economic problems of this industrial sector which, to date, encounters intrinsic and unsurmountable obstacles in the way of reducing costs and mass-producing conventional skis while maintaining high standards of quality.

Claims

1. Double-shoe ski characterized by the fact of comprising a rear shoe (10) and a front shoe (11) aligned according to their longitudinal axis, an intermediate link member (12) between the two shoes (10, 11), said link member (12) being hinged to at least one of the aforesaid shoes (10, 11); and an elastic member (20, 21) between said link member (12) and the aforesaid at least one shoe (10, 11).

2. Ski as claimed in claim 1, characterized by the fact that said link member (12) is hinged to an intermediate point of the front shoe (11), respectively to the front end of the rear shoe (10), and by the fact that the elastic members (20, 21) are disposed near to the hinge connections (17, 18) between the link member (12) and the front shoe (11), respectively between the link member (12) and the rear shoe (10).

3. Ski as claimed in claim 2, characterized by the fact that the elastic member (21) is disposed between the rear shoe (10) and a rear extension of said link member (12).

4. Ski as claimed in claim 1, characterized by the fact that the link member (12) is hinged in an intermediate position to the front shoe (11), and is rigidly secured to the rear shoe (10).

5. Ski as claimed in claim 2 or 4, characterized by the fact that the link member (12) between the shoes (10, 11) is hinged to the front shoe (11) close to the center zone of the portion of the shoe designed to come into contact with the ground.

6. Ski as claimed in claim 1, characterized by the fact that said elastic members (20, 21) are in the form of adjustable spring members.

7. Ski as claimed in claim 6, further characterized by the fact that adjustable stop means are provided at the start and end of the stroke of the spring member (20, 21).

8. Ski as claimed in claim 1, characterized by the fact that said link member (12) is in the form of a rigid or semi-rigid arm.

9. Ski as claimed in claim 1, characterized by the fact that each shoe (10, 11) is in the form of a flat shoe, ending with an upwardly curved front end.

10. Ski as claimed in claim 9, characterized by the fact that each shoe (10, 11) has outwardly curved lateral edges.

11. Ski as claimed in claim 10, characterized by the fact that the point of maximum width of the front shoe (11) is positioned forward to and in an area close to the hinge connection (18) to the linking member.

12. Ski as claimed in claim 10, characterized by the fact that the front shoe (11) has a shape similar to a drop having a truncated tail.

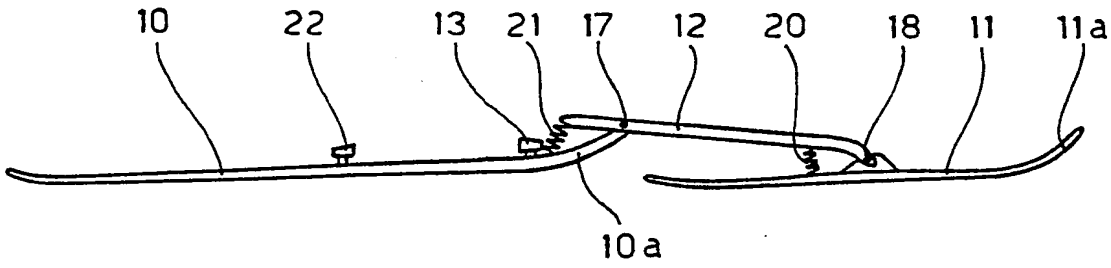

Fig. 7

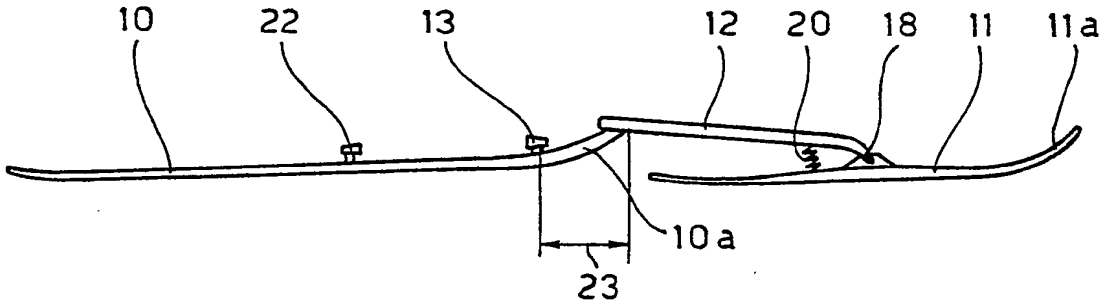

Fig. 8

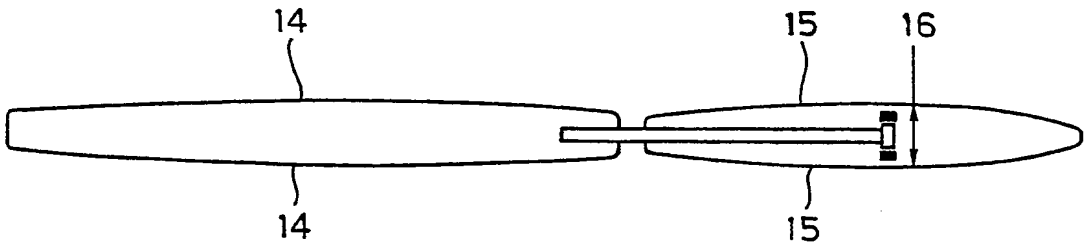

Fig. 9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 87 11 1106

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-A-2 010 382 (KOMINEK) * claim 1; page 3, lines 15-20; figures 3, 4 *	1	A 63 C 5/00
A	---	2,4,8	
A	EP-A-0 184 000 (STAMPPACCHIA) * claim 1; page 8, lines 6-22; figures 1, 6 *	1,9	
A	---		
A	FR-A-2 423 243 (MORYS) * claims 1, 2; figure 1 *	1	
A	---		
A	DE-U-7 235 324 (BELZIG) * claims 1, 2; figure 1 *	1,4,5	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

A 63 C 5/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	27-11-1987	PAPA E.R.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)